Ultra-Flexible Advanced Stiffness Truss for Large Solar Arrays, Phase II

Completed Technology Project (2015 - 2017)

Project Introduction

The main goal in Phase II will be to develop several prototypes of the Ultra-FAST boom that is needed as the Trunk beam in the 300 kW GRA Solar Electric Propulsion (SEP). The target bending strength requirement will be twice of the SRTM ADAMS truss (2 x 0.04 g). Also, with the help of our subcontractor, High Strain Dynamics, L.Garde plans to study the integration of U-FAST into a 300 kW solar array system. These goals will allow the success of NEO NASA mission in ~10 years. Therefore, we will update of the U-FAST design in order to obtain a 0.08g bending strength parameter for a 300kW solar array system. This will be possible by increasing (10-20) the number of longerons in the truss and having a 80% slenderness reduction in the longerons. Also, finite element analyses will be executed to study integration of U-FAST into a 300 kW solar array system. Including dynamic analysis for truss deployment reability and integrity; and truss static analysis for stiffness and strength in bending. Finally, fabrication and testing of three prototypes will be done to validate the finite element solution.

Primary U.S. Work Locations and Key Partners

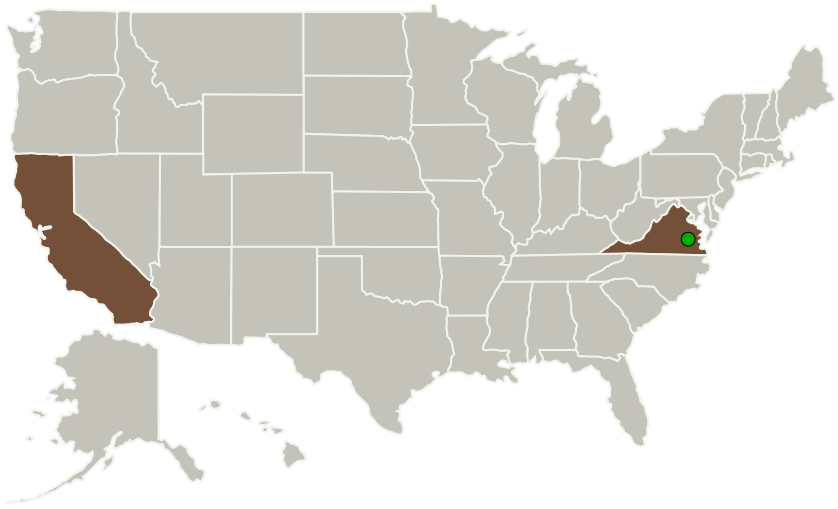

Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

L'Garde, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Continued on following page.

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Organizations Performing Work	Role	Type	Location
L'Garde, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Tustin, California
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
California	Virginia

Project Transitions

May 2015: Project Start

March 2017: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140735)*

Images

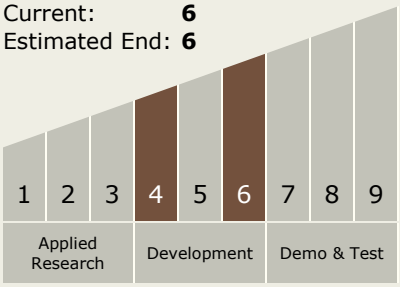
Briefing Chart Image
Ultra-Flexible Advanced Stiffness Truss for Large Solar Arrays, Phase II
(https://techport.nasa.gov/image/130591)

Project Management *(cont.)*

Principal Investigator:
Bill M Davidson

Technology Maturity (TRL)

Start: **4**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.2 Structures
    - TX12.2.1 Lightweight Concepts

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System